

Form PTO-1390 (REV. 10-94)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER 750638.90015
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371			U.S. APPLICATION NUMBER (35 U.S.C. 1.5) 097719115
INTERNATIONAL APPLICATION NO PCT/AU99/00478	INTERNATIONAL FILING DATE 15 June 1999	PRIORITY DATE CLAIMED 12 June 1998	
TITLE OF INVENTION A TOOTHBRUSH			
APPLICANT(S) FOR DO/EO/US LEUERMANN, Walter Bernard Albert			
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:			
<p>1. <input checked="" type="checkbox"/> This is a <b>FIRST</b> submission of items concerning a filing under 35 U.S.C. 371.</p> <p>2. <input type="checkbox"/> This is a <b>SECOND</b> or <b>SUBSEQUENT</b> submission of items concerning a filing under 35 U.S.C. 371.</p> <p>3. <input type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).</p> <p>4. <input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.</p> <p>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2))</p> <p>a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau).</p> <p>b. <input type="checkbox"/> has been transmitted by the International Bureau</p> <p>c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US)</p> <p>6. <input type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)).</p> <p>7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))</p> <p>a. <input checked="" type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau).</p> <p>b. <input type="checkbox"/> have been transmitted by the International Bureau.</p> <p>c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</p> <p>d. <input type="checkbox"/> have not been made and will not be made.</p> <p>8. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</p> <p>9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</p> <p>10. <input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</p> <p>Items 11. to 16. below concern document(s) or information included:</p> <p>11. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</p> <p>12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</p> <p>13. <input checked="" type="checkbox"/> A <b>FIRST</b> preliminary amendment</p> <p><input type="checkbox"/> A <b>SECOND</b> or <b>SUBSEQUENT</b> preliminary amendment.</p> <p>14. <input type="checkbox"/> A substitute specification.</p> <p>15. <input type="checkbox"/> A change of power of attorney and/or address letter.</p> <p>16. <input checked="" type="checkbox"/> Other items or information: Copy of Amended Specification Pages 2-9B and Amended Claims 1-4, as Prepared and Filed Under Article 34 on 06 Dec. 1999 and 04 July 2000, respectively; Postcard Receipt</p>			

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: **LEUERMANN** Docket No.: 750638.90015  
Serial No.: **Unassigned** Filed: **Concurrently herewith**  
Int'l appln No.: **PCT/AU99/00478** Int'l filing date: **15 June 1999**  
Title: **A TOOTHBRUSH**

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**PRELIMINARY AMENDMENT**

Box PCT  
Assistant Commissioner for Patents  
Washington, D.C. 20231

Dear Sir:

In connection with the above-identified application filed herewith, please enter the following preliminary amendment:

**IN THE CLAIMS:**

Please amend claims 3 and 4 as follows:

3. A toothbrush as claimed in [any one of the preceding claims] claim 1, wherein there is also provided locking means for selectively preventing reciprocal movement of said handle relative to said housing.

4. A toothbrush as claimed in [any one of the preceding claims] claim 1, wherein the housing further includes at least one fixed bristle assembly attached thereto.

**Remarks**

The above amendments are being made to eliminate multiple dependencies in the claims of this application.

No fee is believed necessary to enter this amendment. However if a fee is necessary, please charge Deposit Account 17-0055.

Applicant respectfully requests that the preliminary amendment described herein be entered into the record prior to examination and consideration of the above-identified application.

QUARLES & BRADY LLP

BY: 

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Date: December 7, 2000

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## A TOOTHBRUSH

This invention relates to a toothbrush.

Dentists and other dental professionals have long recognized the advantages in applying a rotary motion to the bristles of a toothbrush when cleaning teeth such  
5 that the bristles move in a generally circular path across the surface of the teeth. This is particularly important in the region where the teeth protrude from the gum line.

It has been observed that the desired rotational action of the bristles can be difficult to achieve using conventional toothbrushes of the type having a head portion that is rigidly connected to a handle due to the size and configuration of both the  
10 toothbrush and the person's mouth.

Attempts have been made to overcome the aforementioned problems by providing toothbrushes that have a head portion which is flexibly connected to the handle. However this still does not overcome the problem that rotational motion of the bristles can only be achieved by the user rotating the entire head portion inside  
15 the user's mouth. This can be rather difficult and wherein generally speaking only the surfaces of some teeth can be cleaned in this manner, particularly if contact with the adjacent surfaces of the mouth are to be avoided.

Toothbrushes having electrically driven rotatable bristles are known. However, electric toothbrushes tend to be rather expensive to purchase.  
20 Furthermore, it has been observed that many people are generally hesitant about placing an electrically powered device in their mouths in the belief that it is potentially dangerous to do so. Manually operated toothbrushes thus remain by far the preferred means by which persons clean their teeth.

Prior attempts have been made to provide a manually operated toothbrush  
25 that can impart a rotary motion to its brush head and thus the bristles mounted

thereon. However, a disadvantage associated with many of these devices is that two hands are often required to operate them. It has also been observed that the construction of many of these devices does not enable users to easily clean the rear molars. In particular, the size of the mouth and the construction of many of the devices prohibits lateral movement of the rotatable bristles across the crown of the rear molars. Furthermore, in many instances the bristles do not move in a circular motion over the surface of the teeth.

It is an object of the present invention to provide a toothbrush that overcomes at least one of the aforementioned disadvantages and which will be reliable and efficient in use.

With the foregoing and other objects in view this invention in one aspect resides in a manually operable toothbrush including:

- a handle having drive means associated with one end thereof;
- a housing that in use is locatable inside a user's mouth and which is adapted to receive said drive means;
- a tube connected to said housing and through which said handle extends;
- a bristle assembly that is capable of rotation relative to said housing, said bristle assembly having a driven portion that is retained within said housing and which is operatively connected to said drive means and wherein rotation of said bristle assembly is effected by reciprocal movement of said handle relative to said housing, and whereby in use a free end of said tube is always located outside the user's mouth.

The housing may, in some embodiments, be capable of flexible movement relative to said handle. For example, the connection connecting the handle to the

housing may be a flexible connection. Alternatively, the handle, or selected portions of the handle, may be constructed from a flexible material.

In addition to having a plurality of rotatable bristles, the housing may also include a plurality of bristles whose position relative to said housing are fixed. The  
5 bristles may be arranged according to a particular pattern. For example, the rotatable bristles may be surrounded by fixed bristles that extend along the periphery of the head portion. In addition, the length of the fixed bristles and the rotatable bristles may be the same or may differ. For example, in one embodiment the longer rotatable bristles may stand proud of the fixed bristles.

10 The drive means may consist of a rack and at least one mating pinion and wherein the rotatable bristles may be mounted on said pinion. In one embodiment, the rack may be connected to or formed integrally with the handle and wherein rotational movement of the bristles is effected by reciprocal movement of the handle towards and away from the housing. Alternatively the rack may consist of a driving  
15 member that is slidably mounted on the handle and wherein movement of the driving member may be effected using the user's thumb.

The rack may also include motion dampening means, such as a tension or compression spring connected to and located intermediate one end of the rack and an opposing end of a separate driving member used to impart motion to the rack.  
20 The motion dampening means may be used to compound the extent of rotational movement of the bristles derived from movement of the driving member.

The drive means, or a significant portion of same, is preferably enclosed within the housing of the toothbrush thereby reducing the likelihood of saliva and food products becoming trapped within the drive means. For example, the rack like end  
25 portion of the handle and the mating pinions may be housed within a tubular housing.

The housing preferably includes a closed end which is inserted in the user's mouth and an opening at the other end through which the handle extends, and wherein the opening is never placed inside the user's mouth during use.

The toothbrush may also include locking means that may be used to  
5 selectively prevent rotational movement of the bristles if desired. This may be particularly beneficial where movement of the bristles is effected by movement of the handle as it will also allow the user to use the toothbrush in a conventional manner.

In another aspect this invention resides in a toothbrush including:

a handle;

10 a head portion connected to said handle, said head portion having a plurality of bristles that are capable of rotation relative to said head portion about an axis that extends laterally from said handle;

drive means associated with said handle for manually driving said rotatable bristles, and

15 locking means that may be used to selectively disable said drive means.

For example the locking means may simply include a pin that is locatable within aligned apertures formed in the driving member and an adjacent portion of the head portion. When the pin is partially withdrawn such that it no longer engages one of the apertures, the driving member is free to move relative to the head portion.  
20 When the pin is removed entirely the driving member can be separated from the rest of the unit thereby enabling a thorough cleaning of the unit if so desired and, if necessary, the replacement of the head portion should the bristles be worn and/or splayed apart.

In another aspect this invention resides in a toothbrush including:

25 a handle;



a head portion connected to said handle, said head portion having a plurality of bristles that are capable of rotation relative to said head portion about an axis that extends laterally from said handle, and

drive means associated with said handle for manually driving said rotatable  
5 bristles, and wherein the portion of said drive means that in use is located inside a person's mouth is housed within said head portion.

Preferably the arrangement of the drive means and the head portion is such that during use, little if any saliva and food products can become trapped inside the head portion amongst the drive means.

10 For example, the drive means may consist of a rack and at least one mating pinion and wherein the rotatable bristles may be mounted on said pinion. In one embodiment, the rack may be connected to or formed integrally with the handle and wherein rotational movement of the bristles is effected by reciprocal movement of the handle towards and away from the head portion. Alternatively the rack may consist  
15 of a driving member that is slidably mounted on the handle and wherein movement of the driving member may be effected using the user's thumb.

The rack may also include motion dampening means, such as a tension or compression spring connected to and located intermediate one end of the rack and an opposing end of a separate driving member used to impart motion to the rack.  
20 The motion dampening means may be used to compound the extent of rotational movement of the bristles derived from movement of the driving member.

The rack like end portion of the handle and the mating pinions may be housed within a tubular housing that forms part of the head portion. The housing preferably includes a closed end which is inserted in the user's mouth and an opening at the

other end through which the handle extends, and wherein the opening is never placed inside the user's mouth during use.

In order that this invention may be more easily understood and put into practical effect, reference will now be made to the accompanying drawings which

5 illustrate a preferred embodiment of the invention, wherein:

FIG. 1 is a plan view of a toothbrush constructed in accordance with the present invention;

FIG. 2 is a partial cross-sectional plan view of the toothbrush illustrated in figure 1;

10 FIG.3 is a view of the underside of the toothbrush illustrated in figure 1;

FIG. 4 is a partial cross-sectional side view of the toothbrush illustrated in figure 1;

FIG.5 is a plan view of four mountings belonging to the toothbrush illustrated in figure 1;

15 FIG. 6 is a side cross-sectional view of a pair of mountings belonging to the toothbrush illustrated in figure 1;

FIG. 7 is a side view of a pinion belonging to the toothbrush illustrated in figure 1;

20 FIG. 8 is a pictorial view of an alternative toothbrush constructed in accordance with the present invention;

FIG. 9 is a pictorial view of the toothbrush illustrated in figure 9 but wherein a portion of the housing has been removed;

FIG. 10 is a cross-sectional view of the handle of the toothbrush illustrated in figure 8, and

FIG 11 shows the toothbrush illustrated in figure 8 apart and in line for assembly.

Figures 1 to 4 show a toothbrush 10 that includes a head portion 11 that is connected to a handle 12 and wherein the head portion 11 includes a plurality of  
5 fixed bristles 13 and four sets of rotatable bristle assemblies 14.

The head portion 11 includes a substantially diamond shaped receptacle 15 having a base wall 16 and opposing side walls 17, 18, 19 20 and 21. The receptacle 15 further includes four axles 22 that extend upwardly from the base wall 16 as illustrated in figures 5 and 6. The receptacle 15 is closed by a lid 23 that includes a  
10 plurality of apertures 24 formed therein through which bristles 13 and individual bristle assemblies 14 extend.

The receptacle 15 is attached to a tubular housing 25 that communicates with the receptacle 15 as illustrated in figures 2 and 4.

The handle 12 includes an intermediate portion 26 and a rack like end portion  
15 27 having two opposing rows of teeth 28. The intermediate portion 26 is slidably received within the tubular housing 25 as shown in figures 2 and 4.

The bristle assemblies 14 each include a cog 29 located intermediate a shoulder 30 and a tubular housing 31 which is adapted to receive and retain the ends of a plurality of bristles 32 that extend upwardly therefrom. The shoulder includes an  
20 axially located, cylindrically shaped, bore which is adapted to receive a respective axle 22.

The toothbrush 10 is constructed in a manner whereby individual bristle assemblies 14 are each rotatably mounted on a respective axle 22. The rack like end portion 27 is then placed within the receptacle 15 such that the teeth 28 mesh  
25 with the teeth of adjacent cogs 29. The bristle assemblies 14 are then retained in

position by the placement of the lid on top of the receptacle 15 such that it effectively closes same.

The toothbrush also includes locking means 40 that may be selectively used to prevent longitudinal movement of the handle 12 relative to the head portion 11.

5 The locking means 40 includes an aperture 41 formed in the intermediate portion 26 of the handle 12 and two opposing slots 42 and 43 formed in the tubular housing 25. The slots 42 and 43 are aligned with one another and the aperture 41 as shown in figures 1 to 4.

The slot 42 includes an enlarged head portion 44 that is adapted to receive  
10 the head portion 45 of a pin 46 that includes a shaft 47 that extends through the aligned slots as illustrated in figure 4.

In use, reciprocal longitudinal movement of the handle 12 relative to the head portion 11 shall cause the bristle assemblies 14 to rotate about respective axes 34. This is only permitted when the head portion 45 of the pin 46 is not located in the  
15 head portion 44 of slot 42. This may be easily achieved by pressing against the end 48 of pin 46 such that it lies substantially flush with the surrounding wall of the housing 25, the shaft 47 being free to travel along the length of the aligned apertures 42 and 43.

The rotational movement of the bristles 32 it is believed will assist with the  
20 cleaning of the user's teeth. However, if the user wishes to use the toothbrush in a more conventional manner, he or she may push the head portion 45 down such that it is retained in the slotted head portion 44, as illustrated in figure 4. When the pin 46 is in this position the handle 12 can not move relative to the head portion 11. Consequently the bristles 34 do not rotate and wherein the toothbrush 10 functions  
25 like most manual toothbrushes that have several rows of fixed bristles.

The user may separate the handle 12 and the head portion 11 by removing the pin 46. This enable the head portion 11 to be cleaned such as by immersing the head portion in a glass containing a suitable disinfectant. Furthermore, if the bristles 13 and 32 are worn or splayed apart, the head portion 11 may be replaced by a new  
5 head portion while retaining the handle 12.

The construction of the head portion is such that little, if any, saliva or food products will pass through the apertures 24 formed in the lid 23 through which the bristles extend. Similarly, because the fit between the apertures 49 in the lid 23 through which the respective tubes 32 extend is a close fit, again it is believed that  
10 little, if any, saliva or food products will pass therethrough.

Furthermore the opening 50 in the housing 25 and the slots 42 and 43 are located far enough away from the head portion 11 that in use neither the slots 42 and 43 or the opening 50 will be placed in the user's mouth. Consequently, there is little likelihood that saliva and food products will enter the housing 15 containing the rack  
15 and pinion members via the slots 42 and 43 or the opening 50.

In the light of the above it is therefore believed that the toothbrush 10 will be easier to use than the prior art; will enable user's to clean their teeth better than conventional toothbrushes because of the inclusion of the rotating bristles 34; will be more hygienic and wherein worn parts can be easily replaced with new parts.

20 Figures 8 to 11 show another toothbrush 100 that includes a head portion 111 that is connected to a handle 112 and wherein the head portion 111 includes a plurality of fixed bristles 113 and two sets of rotatable bristle assemblies 114.

The head portion 111 includes a substantially diamond shaped receptacle 115 having a base wall 116 and opposing side walls 117, 118, 119 120 and 121. The  
25 base wall 116 includes two aperture 122 formed therein. The receptacle 115 is

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closed by a lid 123 that includes a plurality of apertures 124 formed therein through which bristles 113 and individual bristle assemblies 114 extend.

The receptacle 115 is attached to a tubular housing 125 that communicates with the receptacle 115 as illustrated in figures 9 and 11. The housing 125 has a  
5 generally rectangular shaped transverse cross-section.

The handle 112 includes an intermediate portion 126 and a rack like end portion 127 having two opposing rows of teeth 128. The intermediate portion 126 has a generally rectangular shaped transverse cross-section and is slidably received within the tubular housing 25 as shown in figure 9. The intermediate portion 126  
10 includes a depending flange 101 that in use is locatable behind an inwardly pointing nib 102 that extends from the opening to the housing 125. Engagement of the nib 102 with the flange 101 prevents any unintentional withdrawal of the handle 112 out of the head portion 111 during use while maintaining engagement of the teeth 128 with the rotating bristle assemblies 114. The location of the flange 101 on the handle  
15 112 marks the rearward extremity of the reciprocating motion of the handle relative to the head portion 111.

The intermediate portion also includes a curved shoulder 103 that in use selectively abuts against the curved mouth 104 of the housing 125. Abutment of the shoulder 103 with the mouth 104 marks the forward extremity of the reciprocating  
20 motion of the handle 112 relative to the head portion 111.

The bristle assemblies 114 each include a cog 129 located intermediate a stub axle 130 and a tubular housing 131. Each stub axle 130 is locatable within a respective aperture 122 and is capable of rotating relative thereto. The housing 131 is adapted to receive and retain one end of a bristles 132 that extends upwardly  
25 therefrom.

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The toothbrush 100 is constructed in a manner whereby individual bristle assemblies 114 are each rotatably mounted on a respective axle 129. The rack like end portion 127 is then placed within the receptacle 115 such that the teeth 128 mesh with the teeth of adjacent cogs 129.

5 In use, reciprocal longitudinal movement of the handle 112 relative to the head portion 111 shall cause the bristle assemblies 114 to rotate about respective longitudinal axes. The rotational movement of the bristles 132 is believed will assist with the cleaning of the user's teeth.

10 However, if the user wishes to use the toothbrush in a more conventional manner, he or she may push their cheek against the head portion 111 so as to immobilise. Then using the thumb, of the hand that is holding the handle 112, to engage the finger abutment 107, of the housing 125, they may prevent continued reciprocal movement of the handle 112 relative to the head portion 111 while they brush their teeth.

15 It will of course be realised that the above has been given only by way of illustrative example of the present invention and that all such modifications and variations thereto as would be apparent to persons skilled in the art are deemed to fall within the broad scope and ambit of this invention as is herein before defined in the appended claims.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A manually operable toothbrush including:

a handle for gripping the toothbrush, said handle having drive means  
5 associated with one end thereof;

a housing that in use is locatable inside a user's mouth and which is adapted  
to receive said drive means, said housing having a tube connected thereto and  
through which a portion of said handle extends, which portion includes the one end  
thereof; and

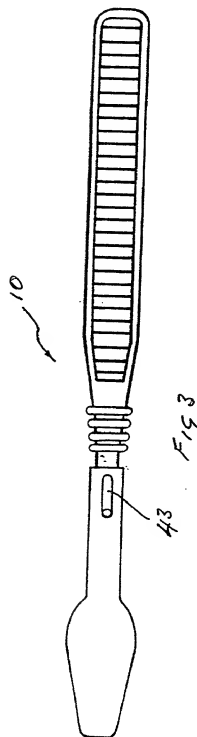
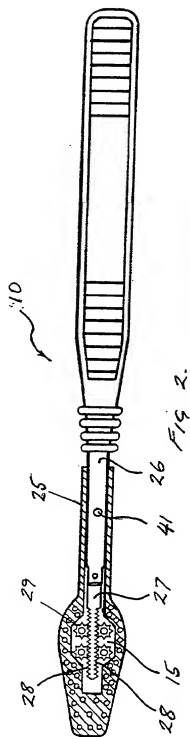
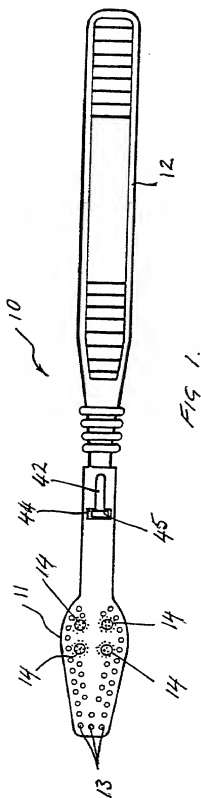
10 at least one bristle assembly that is capable of rotation relative to said  
housing, said at least one bristle assembly having a driven portion that is retained  
within said housing and which is operatively connected to said drive means and  
wherein rotation of said at least one bristle assembly is effected by reciprocal  
movement of said handle relative to said housing, and whereby in use a free end of  
15 said tube is retained outside the user's mouth.

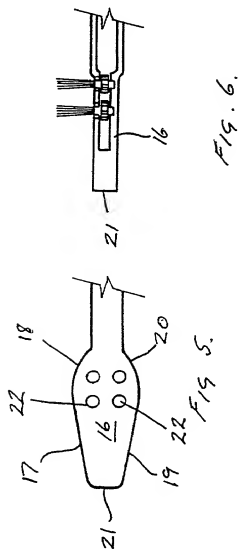
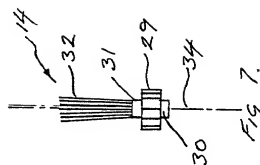
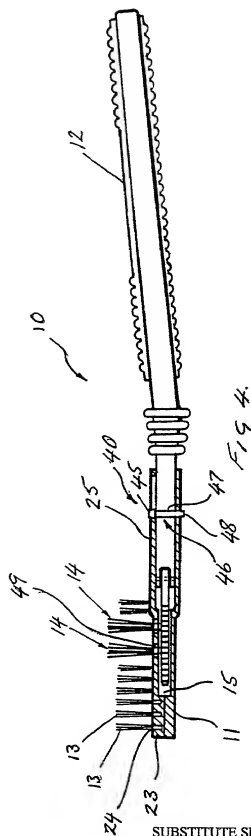
2. A toothbrush as claimed in claim 1, wherein said drive means includes a rack  
and said driven portion of said bristle assembly includes a pinion which is adapted to  
- mate with said rack.

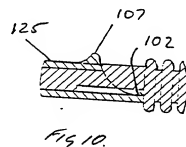
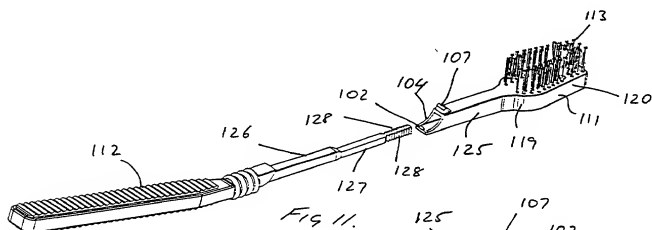
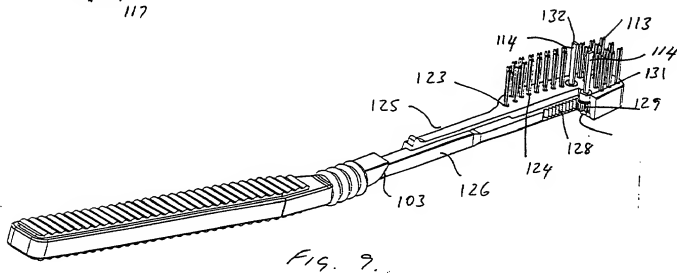
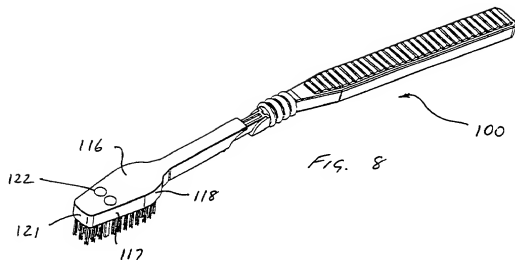
3. A toothbrush as claimed in any one of the preceding claims, wherein there is  
also provided locking means for selectively preventing reciprocal movement of said  
handle relative to said housing.

25 4. A toothbrush as claimed in any one of the preceding claims, wherein the  
housing further includes at least one fixed bristle assembly attached thereto.









## COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY

(Includes Reference to PCT International Applications)

ATTORNEY DOCKET NUMBER  
750638.90015

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

A TOOTHBRUSH

the specification of which (check only one item below):

☐ is attached hereto.

☐ was filed as U.S. Patent Application Serial Number \_\_\_\_  
on \_\_\_\_,  
as amended on \_\_\_\_ (if applicable).

[X] was filed as a PCT international application number PCT/AU99/00478 on 15 June 1999  
as amended under PCT Article 19 on 14 Sept 1999 (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations §1.56(a).

I hereby claim foreign-priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the applications for which priority is claimed:

## PRIOR FOREIGN PATENT APPLICATION(S) AND ANY PRIORITY CLAIMED UNDER 35 U.S.C. §119:

COUNTRY (If PCT indicate PCT)	APPLICATION NUMBER	DATE OF FILING (Day, Month, Year)	PRIORITY CLAIMED UNDER 35 USC 119
PCT	PCT/AU99/00478	15 June 1999	[X] YES [ ] NO
			[ ] YES [ ] NO
			[ ] YES [ ] NO
			[ ] YES [ ] NO

